Higher rates of fixed N (Ndfa) and lower rates of harvested N in seeds (NHI) both produce positive N incrimination (Ninc) in soil. Positive effects of inoculated lentil on soil Ninc were observed on soil from the Brown soil zone of Saskatchewan. Inoculants, N fertilizer and the control did not change soil Ninc significantly. However, lentil crops grown with N fertilizer depleted soil by 0.16 g m⁻².

RESULTS

Individual soil rhizobia, drought conditions and available soil N caused similar Ndf, NHI and Ninc among the treatments (Fig 1). Inoculated and the control credited the soil N by 2.1 and 0.5 g m⁻², respectively. Although the “N treat” had a negative impact on soil N balance, differences among the three treatments were not significant. Nitrogen fertilizers could increase plant growth and its N uptake at early growth stages, and also reduce rhizobia activity and N fixation at the same time.

CONCLUSIONS

Including lentil to the rotation increased soil N, due to the higher Ndfa than NHI; Fertilizers reduced N use efficiency by retarding N fixation; Different cultivars had different effects on soil Ninc.